

The Cumulative Injury Cycle diagram illustrates a feedback loop of injury factors. The cycle consists of the following components and their interactions:

- 100**: Initial point of the cycle.
- 102**: **Weak and Tense** (box).
- 104**: **Friction, Pressure, and Tension** (box).
- 106**: **Tear or Crush** (box).
- 108**: **Inflammation** (box).
- 110**: **Adhesion-Fibrosis** (box).
- 112**: **Inflammation Cycle** (dashed line).
- 114**: **Chronic Cycle** (dashed line).
- 116**: **Decreased Circulation, Edema** (box).

The cycle is completed by a dashed line from **116** back to **100**. A legend on the right lists three types of injury: 1. Acute Injury, 2. Repetitive Injury, and 3. Constant Pressure or Tension.

Figure 1

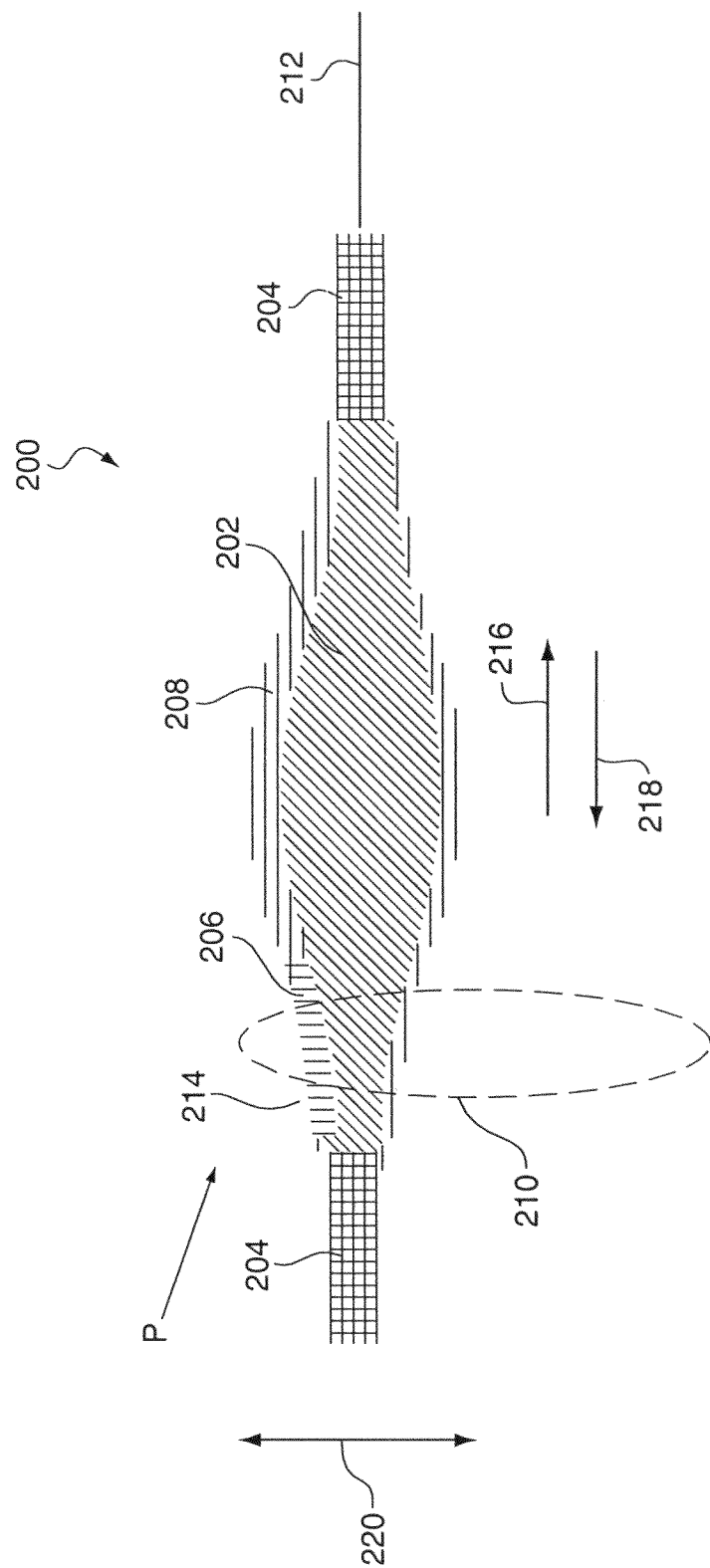


FIG. 2

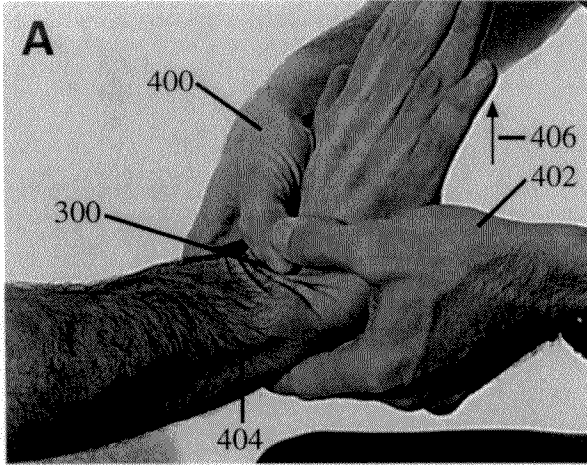


Figure 4

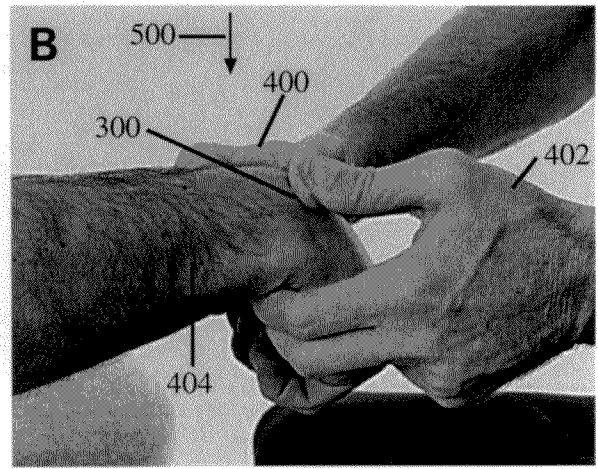


Figure 5

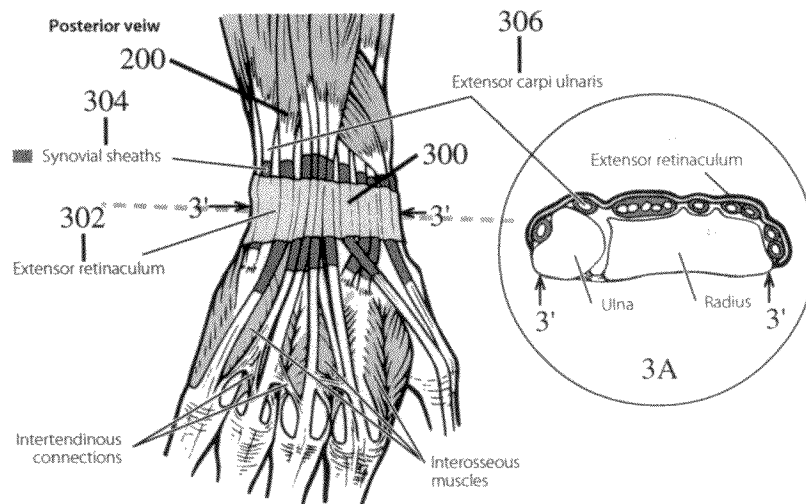
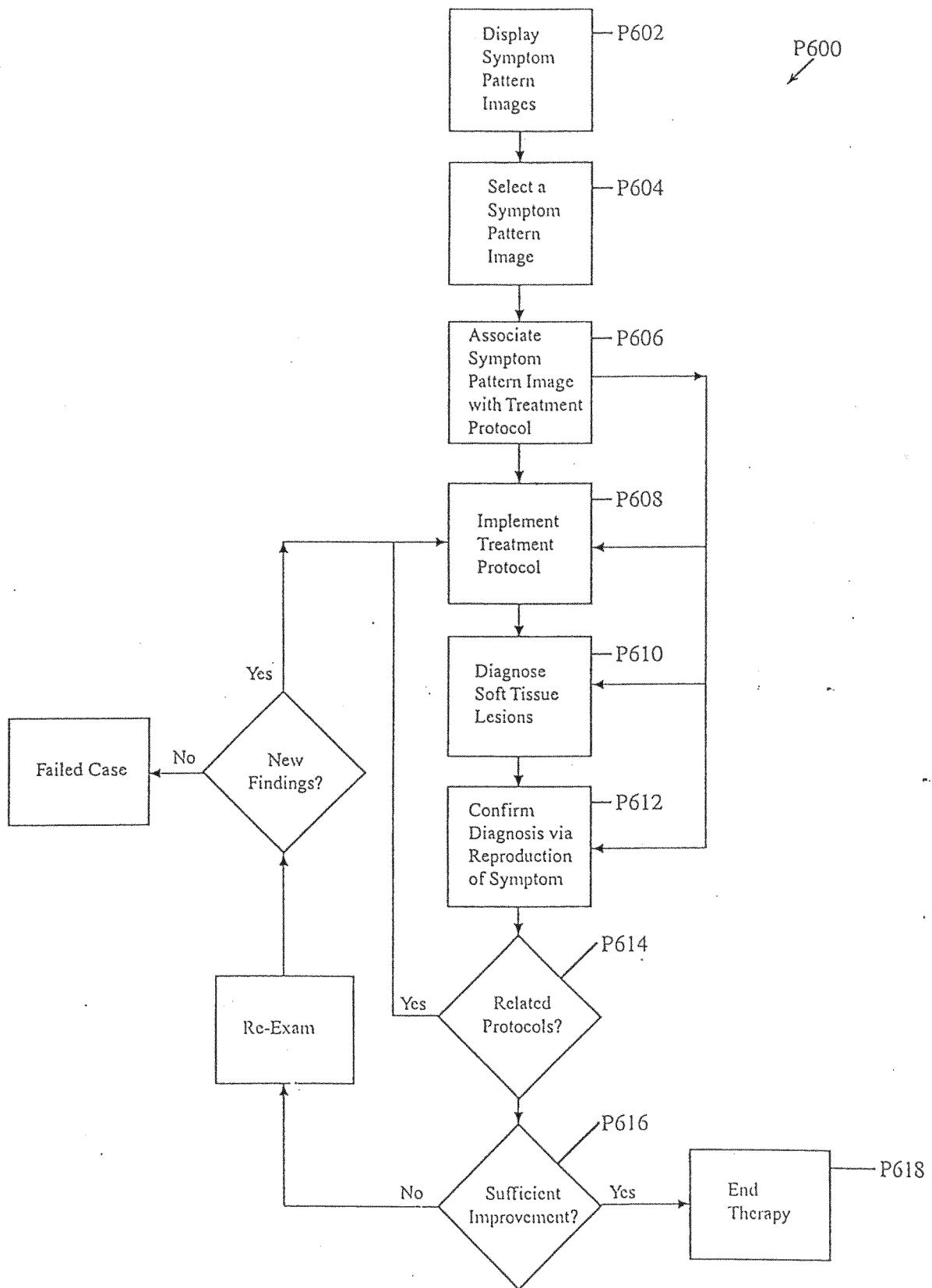


Figure 3



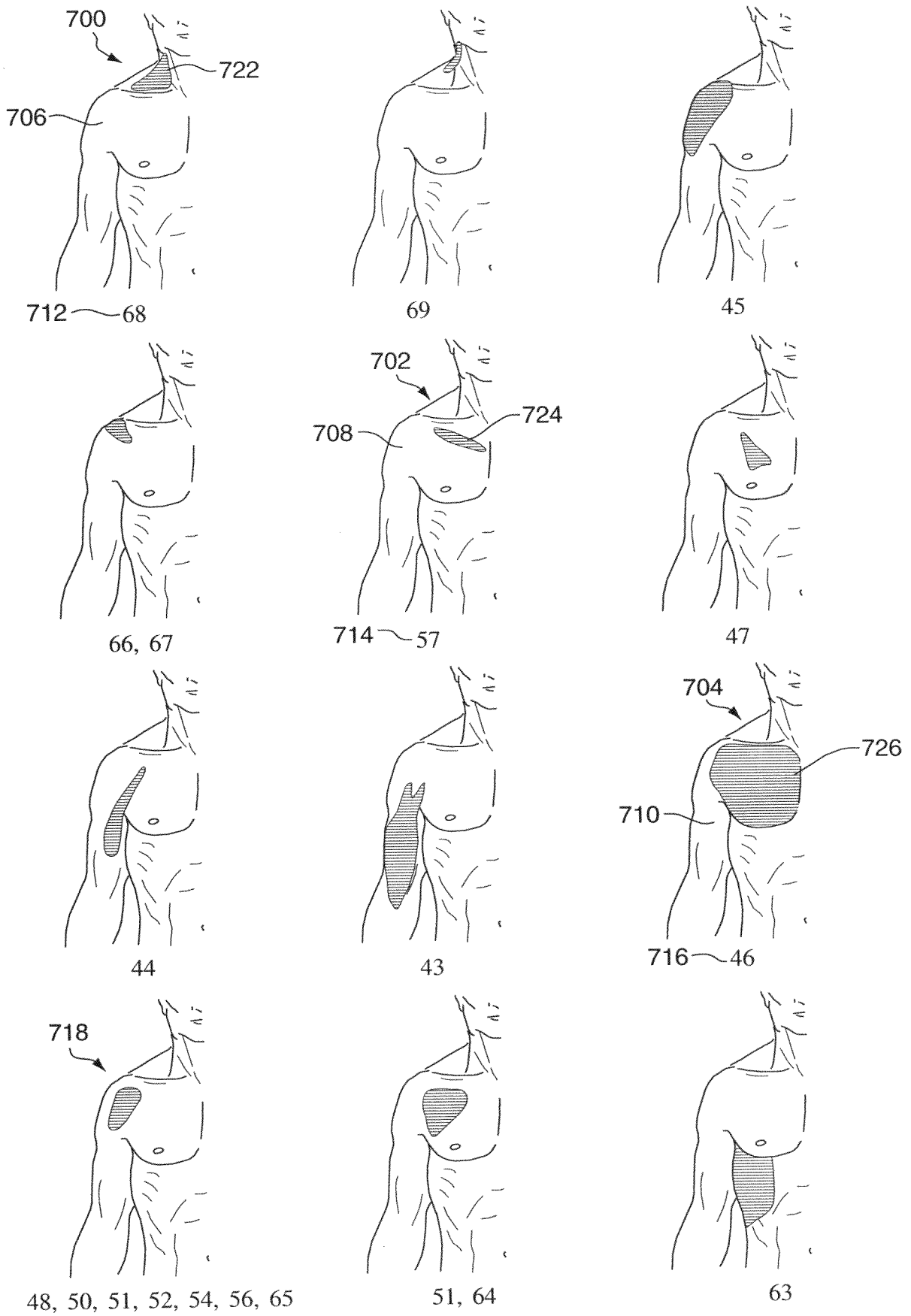


FIG. 7

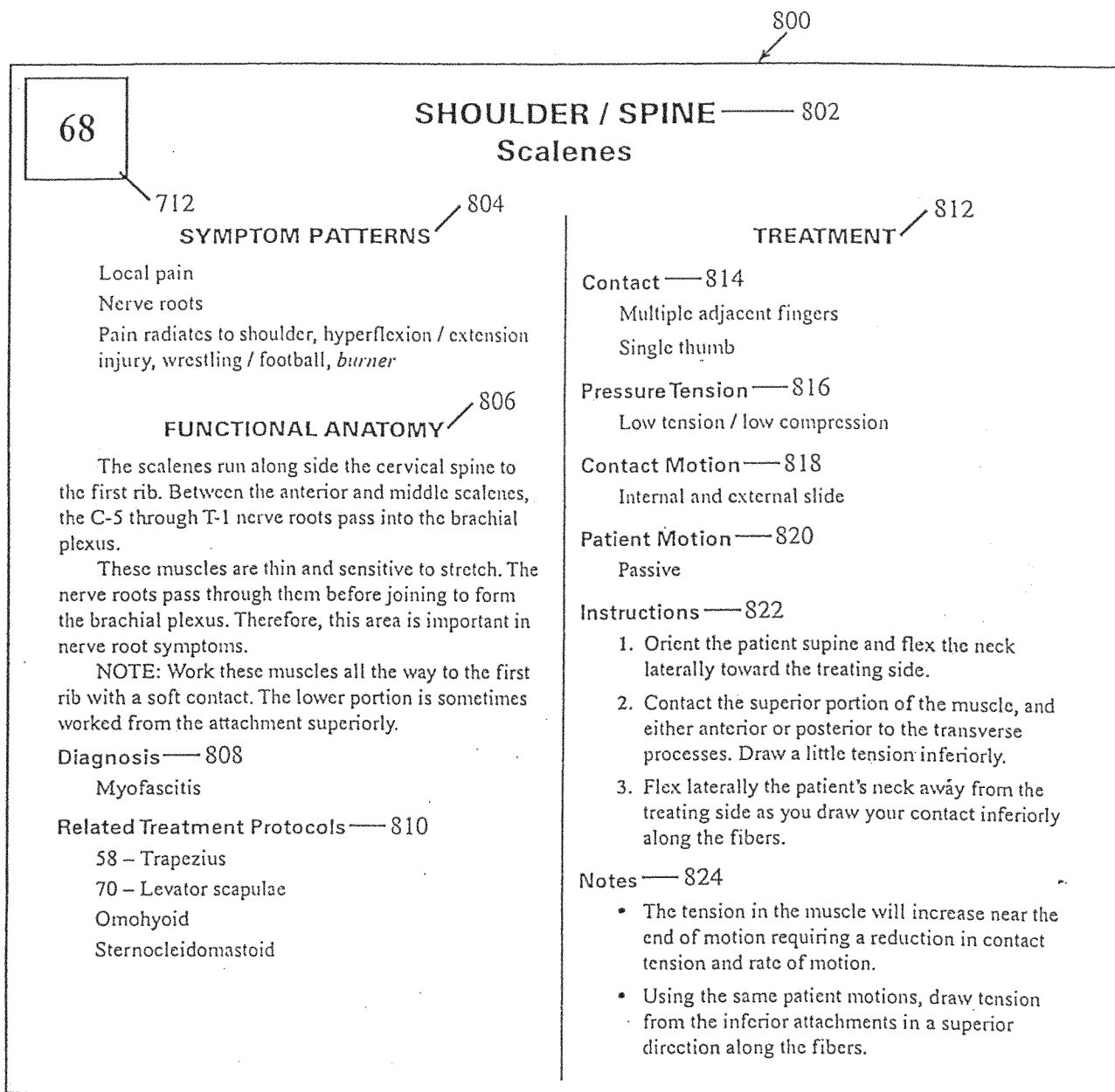


Figure 8

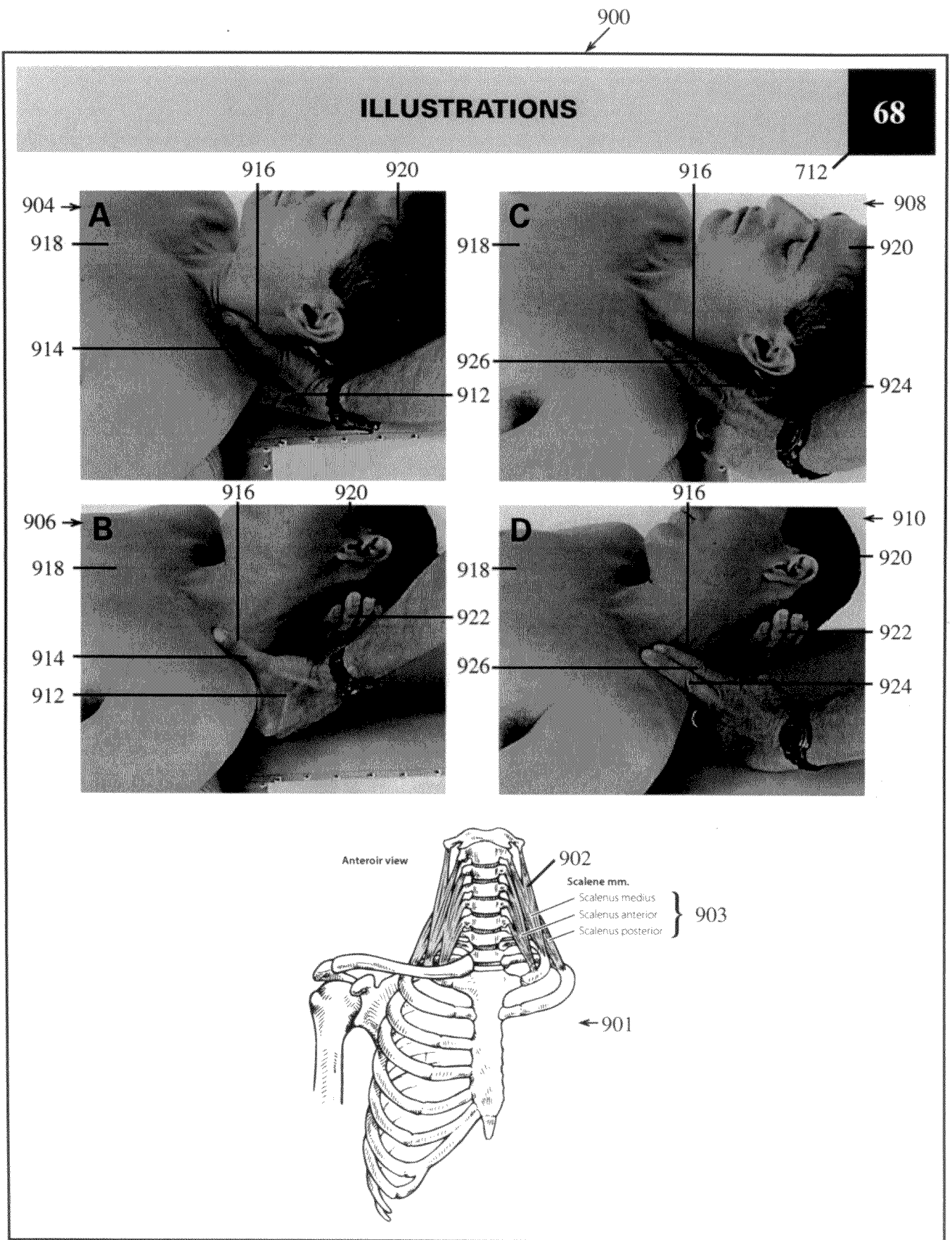


Figure 9

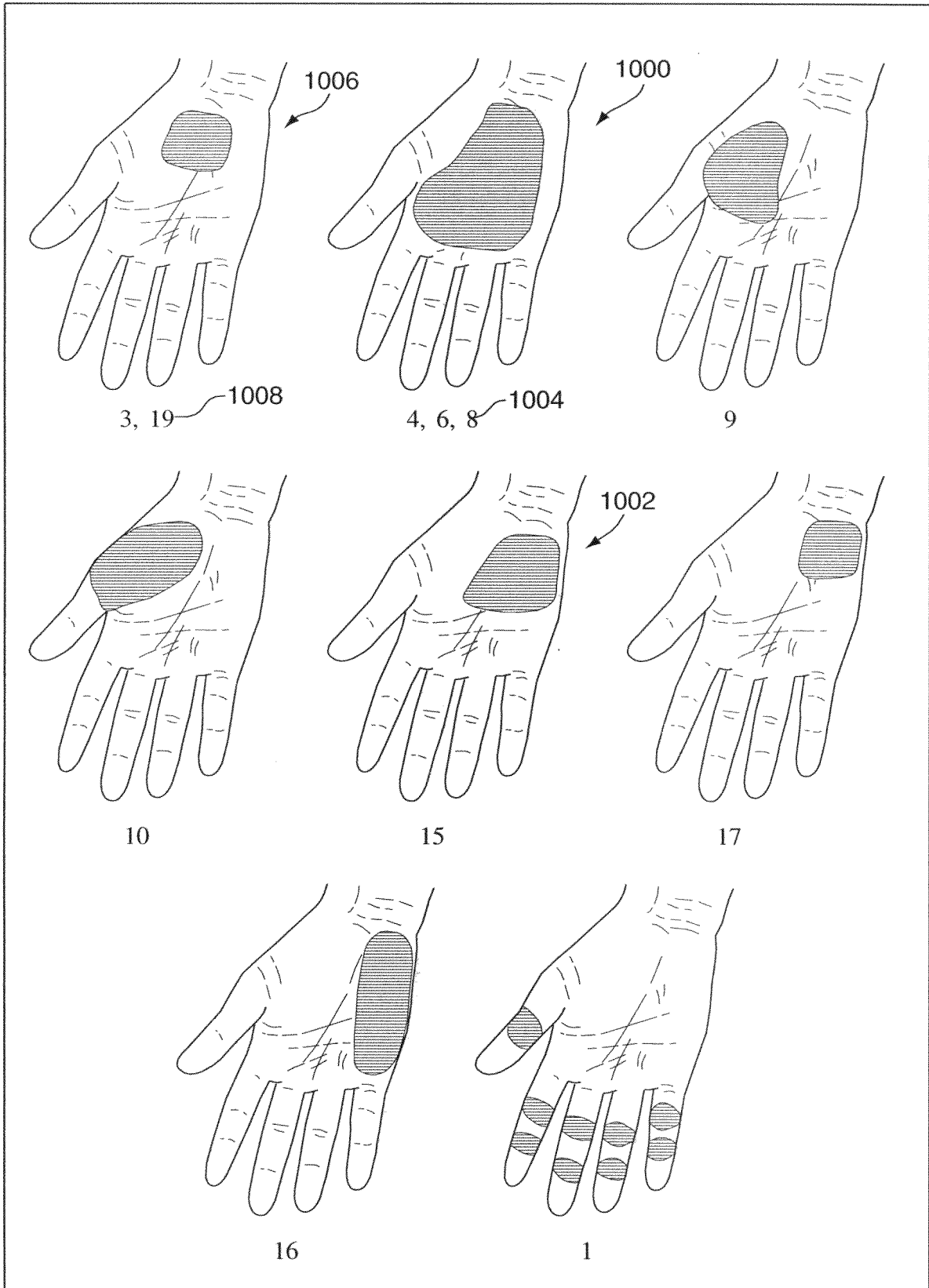


FIG. 10

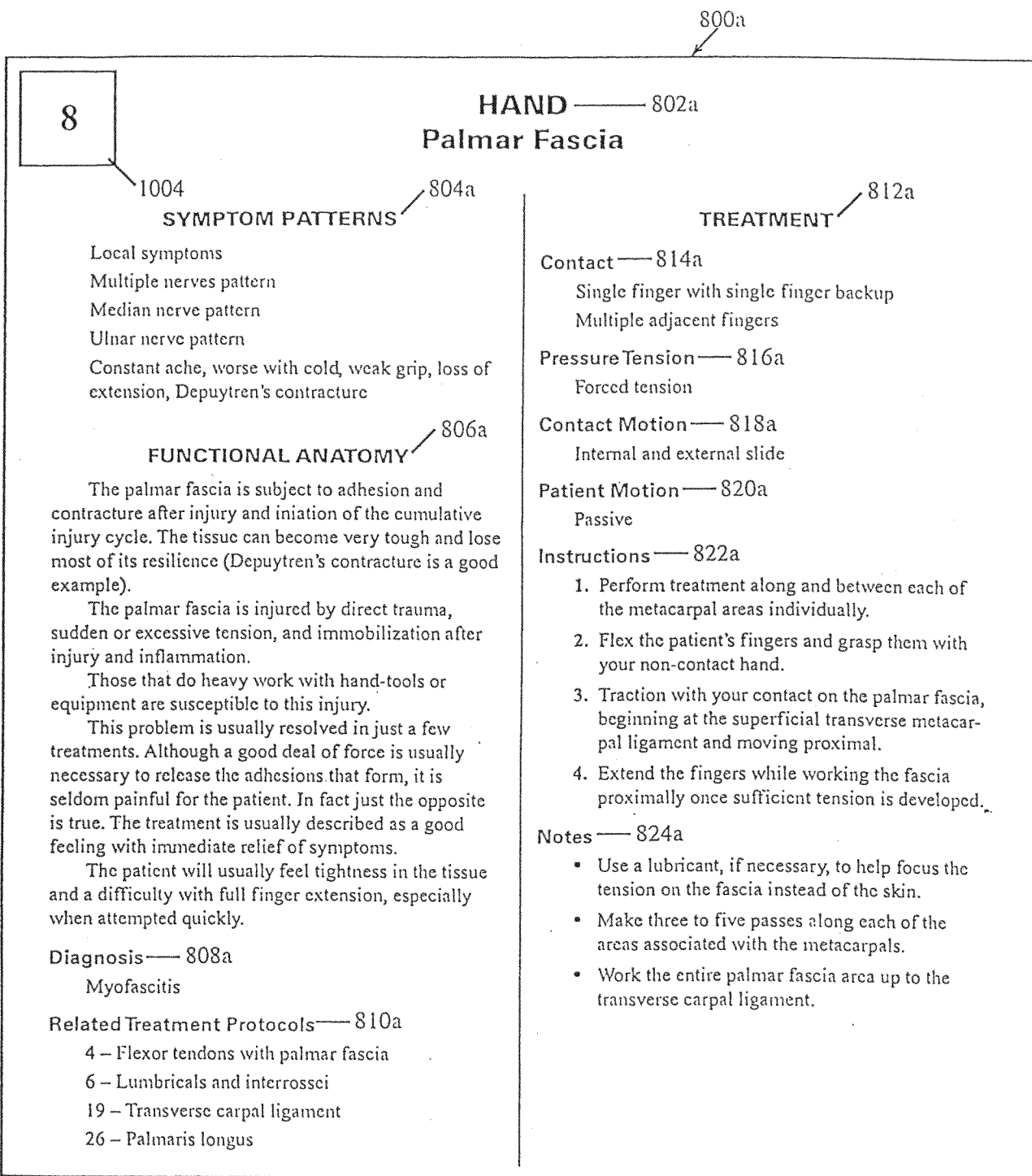


Figure 11

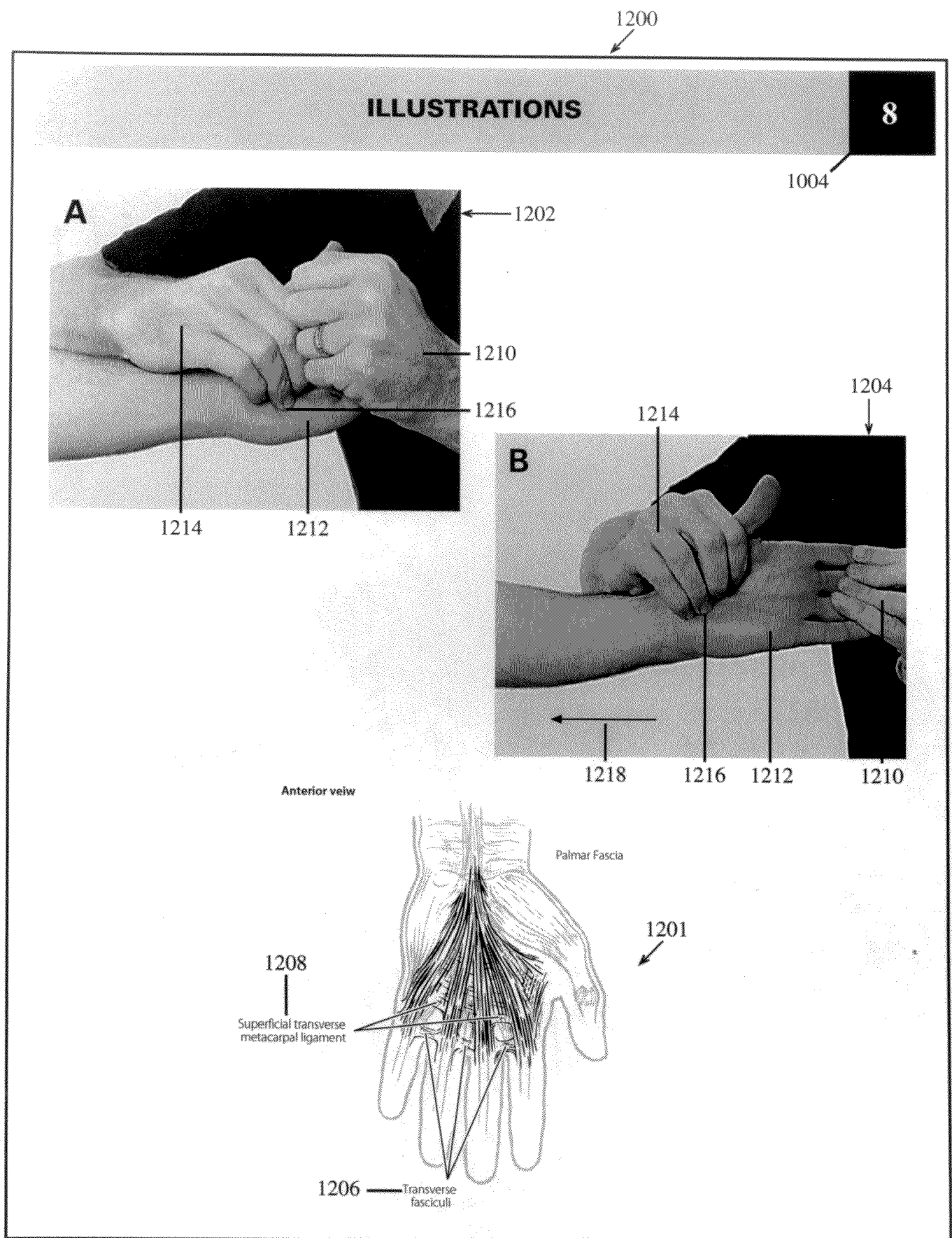


Figure 12

Transverse Carpal Ligament

1008

SYMPTOM PATTERNS — 804b

Local symptoms
Median nerve pattern
Restricted motion, edema, "carpal tunnel"

FUNCTIONAL ANATOMY — 806b

The transverse carpal ligament is most easily found by contacting at the pisiform and moving across the wrist. Because the median nerve may send branches through this ligament it cannot be assumed that the entire nerve passes under it.

NOTE: The transverse carpal ligament is often suspected with median-nerve entrapments but it is seldom the cause. When it causes median nerve entrapment, treating the other sites only will not resolve the problem. The ulnar nerve may become hypersensitive due to its close proximity.

Diagnosis — 808b

Myofascitis

Related Treatment Protocols — 810b

- 3 – Flexor tendons with transverse carpal ligament
- 10 – Thenar muscles
- 15 – Palmaris brevis
- 16 – Hypothenar muscles
- 81 – Median nerve at carpal tunnel

800b

TREATMENT — 812b

Contact — 814b

Single finger

Pressure Tension — 816b

High tension / low compression

Contact Motion — 818b

Internal and external slide or stationary

Patient Motion — 820b

Passive

Instructions — 822b

1. Place the patient's wrist in a neutral position (hold this neutral wrist throughout the treatment).
2. Contact near each end of the ligament and place your thenar pads against the back of the wrist.
3. Grasp the patient's thumb.
4. Exert as much tension on the ligament as the patient allows by using your thenar pads as levers.
5. Draw the contacts toward the ends of the ligament. The thumb may be abducted and moved posteriorly for extra tension.

Notes — 824b

- Move slowly and hold the tension for a few seconds at a time.
- Hold the tension for about five seconds, or until the median-nerve symptoms are duplicated. When symptoms are duplicated, stop the tension and set up for another attempt with slightly less tension.
- Work the palmer carpal ligament at the same time.

Figure 13

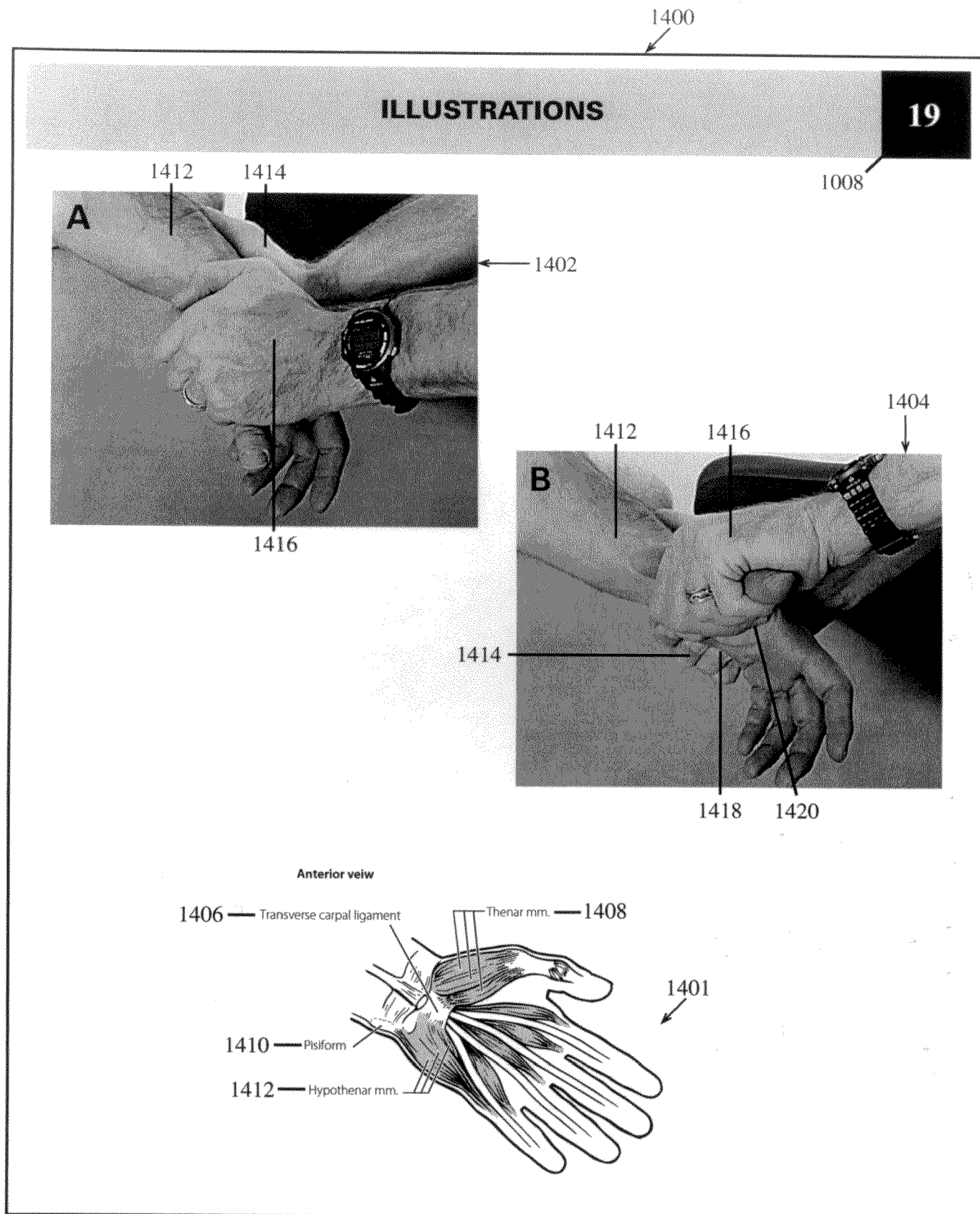


Figure 14

51

SHOULDER — 802c

Subscapularis

720

SYMPTOM PATTERNS — 804c

Local pain

Multiple nerves

Ulnar nerve

Bench press, push motions, swimming, popping shoulder, throwing, fall on arm, limited range with abduction and external rotation

FUNCTIONAL ANATOMY — 806c

Lesions at this site are often the result of heavy push motions. Competitive swimmers have this injury which leads to instability of the rotator cuff and impingement syndrome.

This muscle is essential for holding the head of the humerus posterior and inferior. With a lesion, the humerus translates anterior and superior causing popping and poor, inefficient biomechanics. This force couple is important to understand when treating shoulder injuries.

NOTE: When a lesion occurs it may affect the medial chord of the brachial plexus first. Then progress to all three chords of the brachial plexus when not treated appropriately. This is a common effect of the cumulative injury cycle.

Diagnosis — 808c

Myofascitis (rotator cuff syndrome, impingement syndrome)

Related Treatment Protocols — 810c

64 – Serratus anterior with subscapularis

71 – Brachial chords at the subscapularis

105 – Ulnar nerve at medial chord of brachial plexus and subscapularis

800c

TREATMENT — 812c

Contact — 814c

Single thumb

Single thumb with two finger backup

Pressure Tension — 816c

High tension / low compression

Delayed tension

Contact Motion — 818c

Delayed internal slide

Patient Motion — 820c

Passive first then active as soon as possible.

Instructions — 822c

1. Place the patient supine.
2. Grasp firmly and slightly abduct the humerus to a comfortable position for the patient that relieves tension on the subscapularis. Keep the patient's elbow bent 90 degrees or more. Do not externally rotate the humerus.
3. Palpate with your thumb past the latissimus dorsi and teres major to the anterior surface of the scapula. Feel the entire surface of the scapula that is covered by the subscapularis, move superior to the brachial chords, then medial into the axilla.
4. Contact inferior to the lesion and draw the skin and loose tissue to a point just supero-lateral to the area to be treated. Exert tension infero-medially along the muscle fiber orientation. Develop tension as the contact reaches the edge of the lesion.
5. Abduct the humerus until the arm overhead, keeping the elbow posterior as much as possible. Perform subsequent passes actively.

Notes — 824c

- Lack of gliding of the brachial chords will usually become evident during the second half of the motion.
- A defect in the fascia or a vein may feel like a thin, firm chord which arches across the body of the muscle. Do not attempt to break this down. Lighten the contact and pass over it to treat the remaining tissue during a pass.
- The muscle may be treated from the axilla to the medial border of the scapula where it meets the serratus anterior. Check for an adhesion between these two structures.

Figure 15

ILLUSTRATIONS

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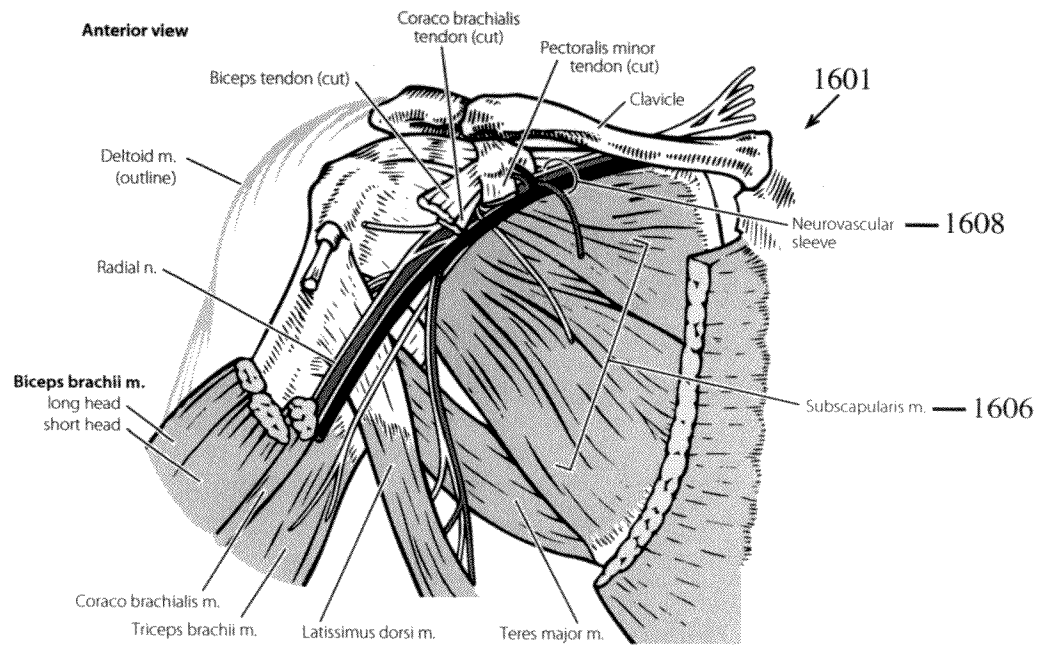
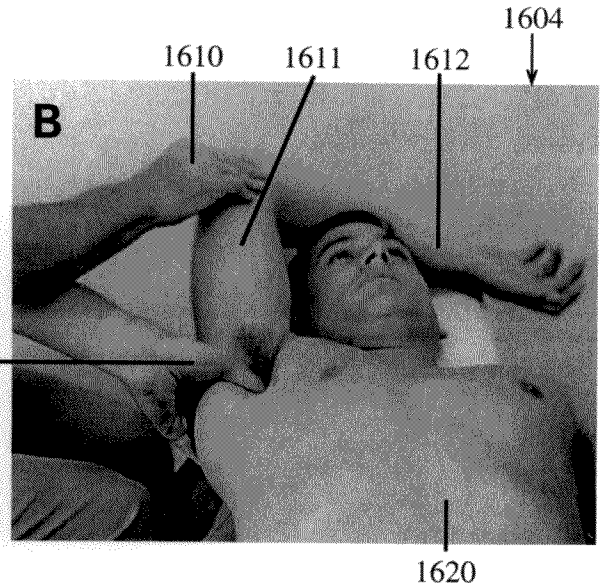
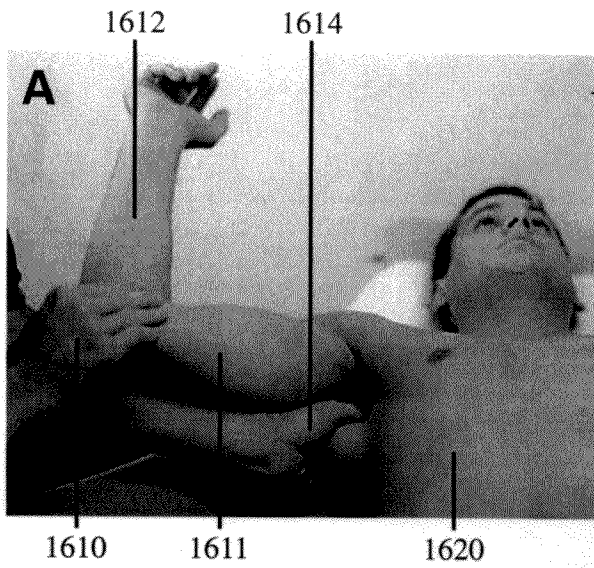


Figure 16

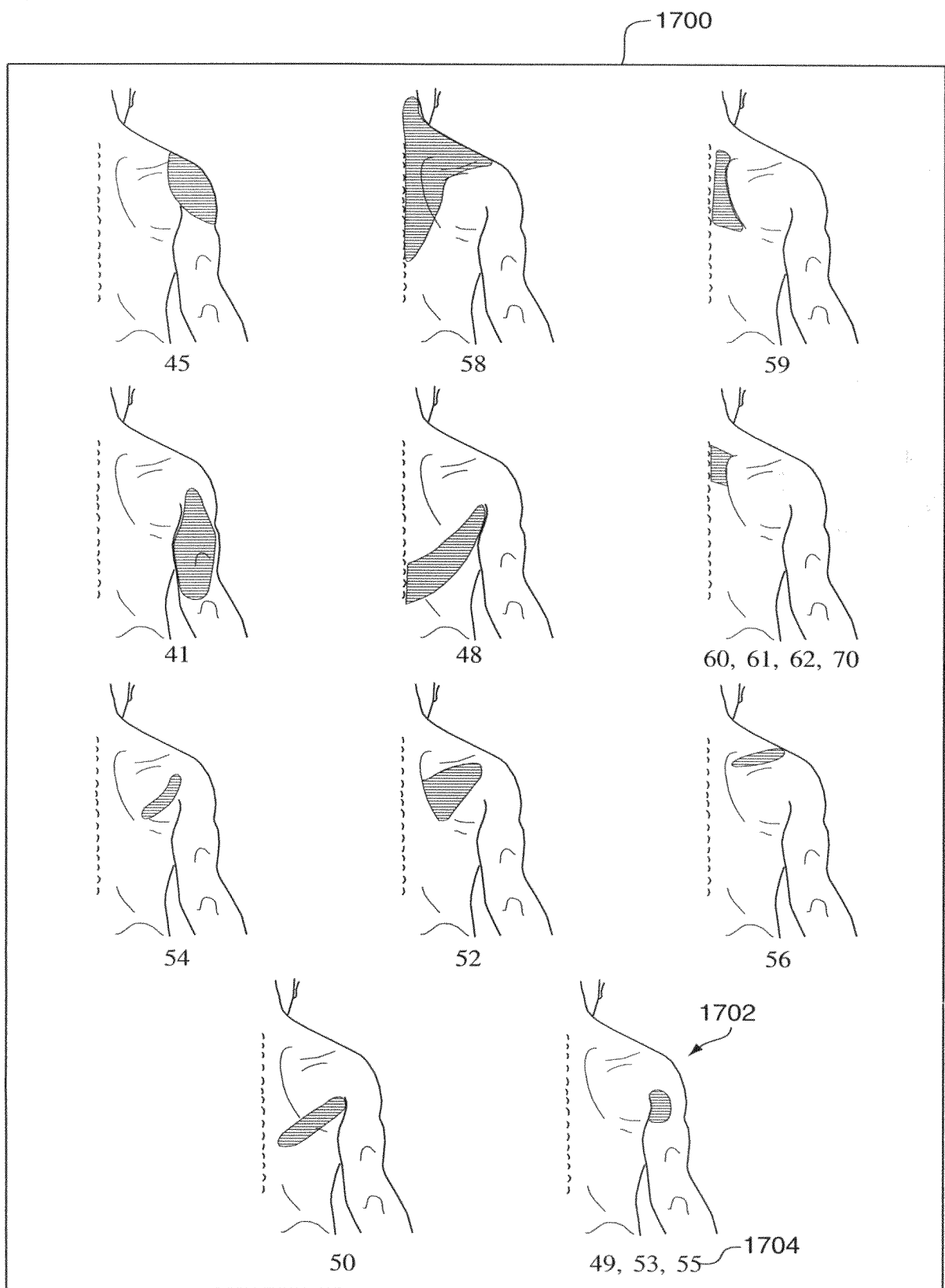


FIG. 17

SHOULDER — 802d

Infraspinatus / Teres Minor with Deltoid

1704

SYMPTOM PATTERNS — 804d

Local pain
Pulling / external rotation motions, difficulty reaching overhead and forward

FUNCTIONAL ANATOMY — 806d

During most motions of the shoulder, the infraspinatus and teres minor slide underneath the deltoid. Sometimes an adhesion develops at the lateral edge of the infraspinatus and teres minor, and the inferior edge of the posterior deltoid.

The infraspinatus and teres minor may also be adhered to the deltoid as it passes under it and around the humerus.

Diagnosis — 808d

Myofascitis

Related Treatment Protocols — 810d

45 – Deltoid

52 – Infraspinatus

54 – Teres minor

800d

TREATMENT — 812d

Contact — 814d

Single thumb

Pressure Tension — 816d

Delayed tension

Contact Motion — 818d

Internal and external slide

Patient Motion — 820d

Active

Instructions — 822d

1. Adduct the humerus with the patient prone.
2. Contact the inferior edge of the posterior deltoid and draw tension medially, arriving at the teres minor with your contact as much under the deltoid as possible.
3. Have the patient reach overhead, keeping the thumb pointing to the floor.

Infraspinatus Under Deltoid

1. Forward flex and externally rotate the humerus.
2. Contact the deltoid just anterior to the infraspinatus and traction the deltoid posterior along the fibers of the infraspinatus.
3. Maintain the traction while internally rotating the humerus.

Notes — 824d

- During patient motion, hold firm tension along the deltoid until it increases abruptly. Then draw your contact medially, trying to work between the muscles while letting the infraspinatus and teres slide underneath.

Figure 18

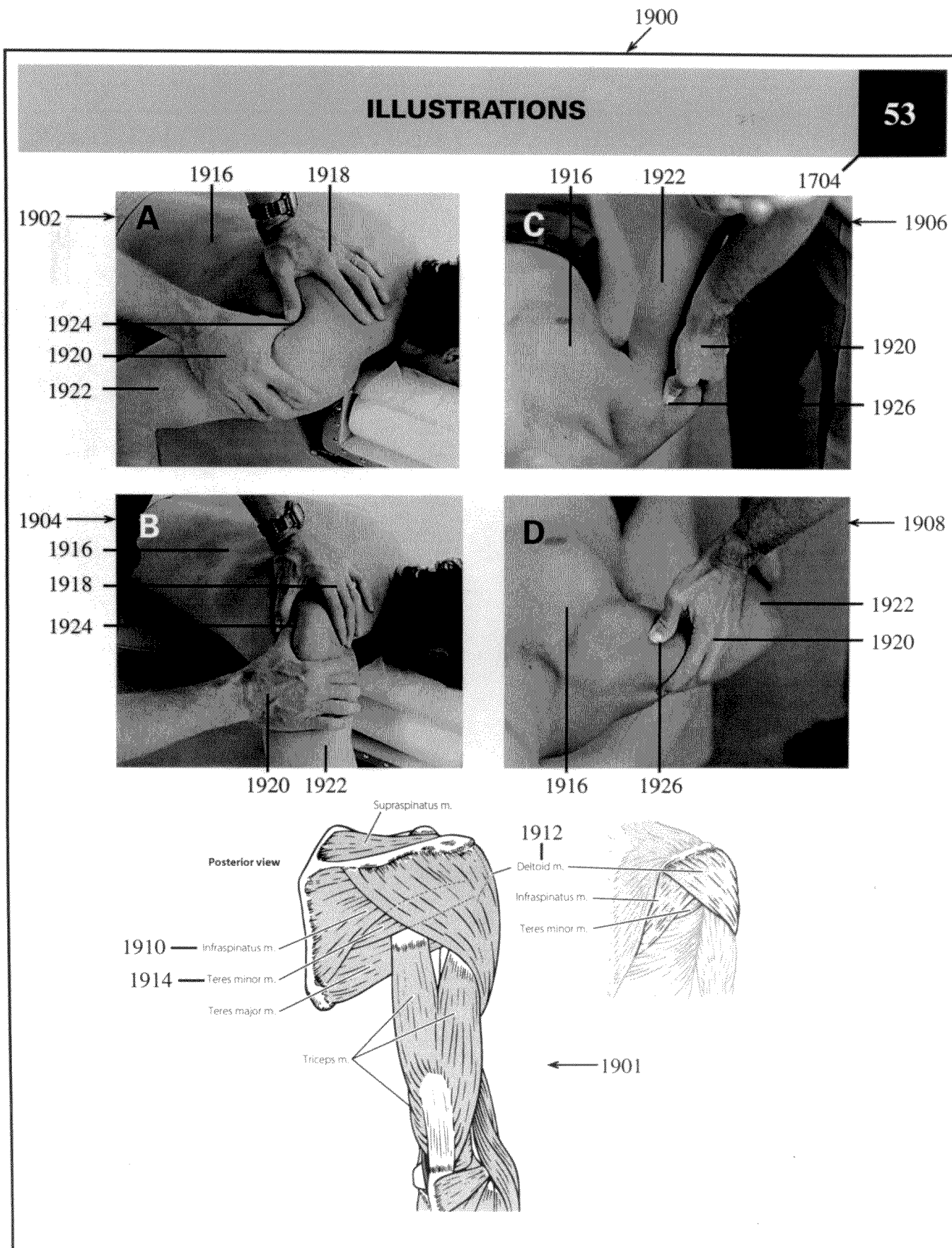


Figure 19

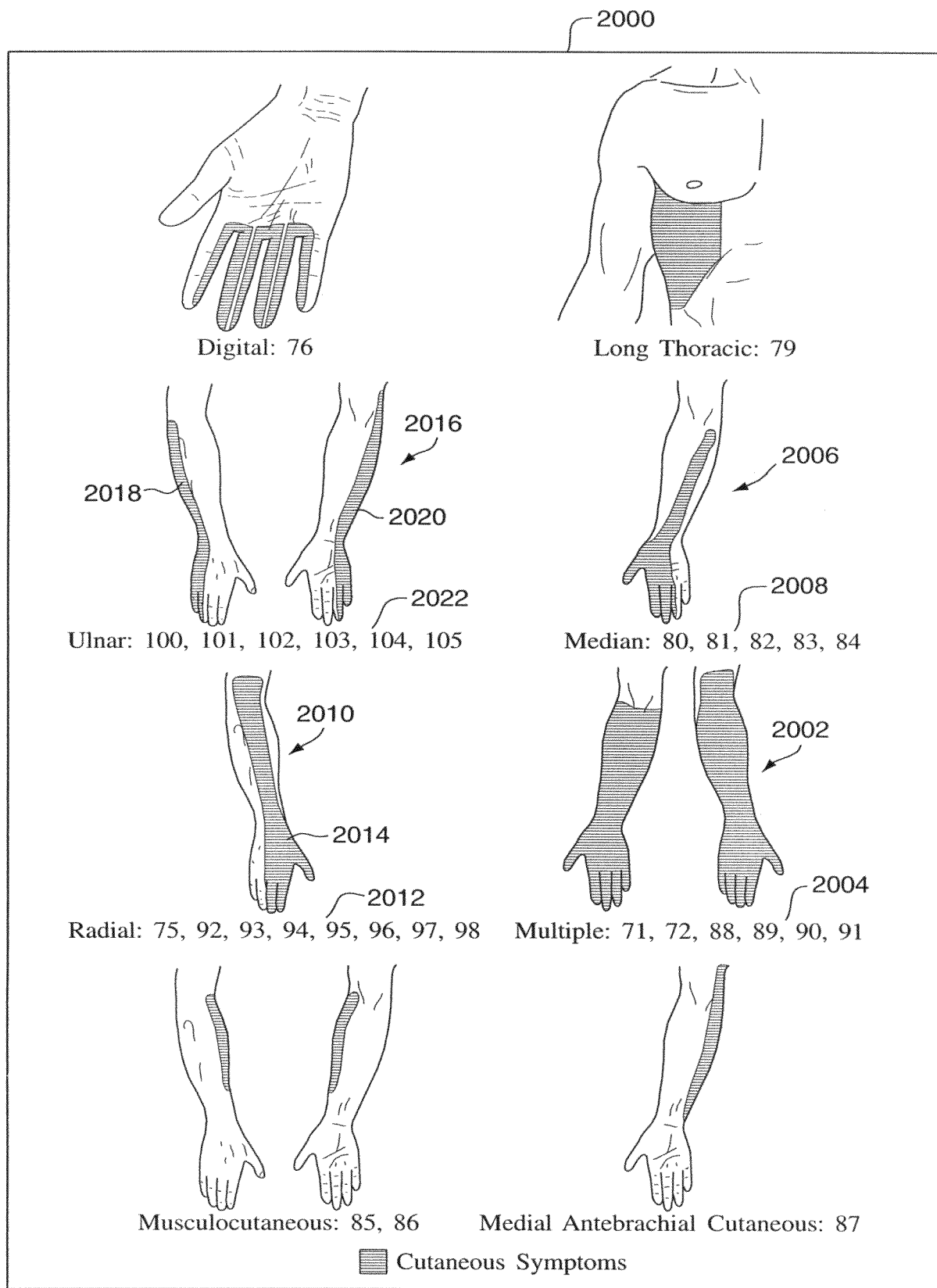


FIG. 20

SHOULDER — 802e

Brachial Chords at Subscapularis

2004

SYMPTOM PATTERNS — 804e

Ulnar nerve
Multiple nerves
Ulnar nerve / medial chord first, all three chords second, whole hand

FUNCTIONAL ANATOMY — 806e

The medial chord of the brachial plexus is usually the first of the chords to be entrapped with the subscapularis. If this process is allowed to worsen, the posterior and lateral chords follow. The brachial chords normally slide in excess of 1.5 centimeters during abduction of the humerus. When an adhesion occurs, it will exert a significant pull on the nerves during this motion.

The chords can be palpated by sliding your contact superior on the subscapularis to the roof of the axilla. The neurovascular sleeve should be palpable on the side of the contact thumb. It is possible to slide your contact to the anterior side of the sleeve and sometimes to the superior side as well. Take care to avoid applying undue compression on the nerves.

During treatment, it is common and desirable to duplicate the exact neurological symptoms. These usually subside in less than a minute, and the patient should be advised. As you palpate the nerve entrapment it is even possible to predict the symptom duplication.

Diagnoses — 808e

Peripheral nerve entrapment
Myofascitis

Related Treatment Protocols — 810e

51 — Subscapularis
90 — Neurovascular sleeve at coraco-pectoral tunnel
91 — Neurovascular sleeve at coracobrachialis

800e

TREATMENT — 812e

Contact — 814e

Single thumb

Pressure Tension — 816e

High tension / low compression

Contact Motion — 818e

Internal and external slide

Patient Motion — 820e

Active

Instructions — 822e

1. Place the patient supine and support the humerus with a firm comfortable grasp. Adduct the humerus to relieve tension on the subscapularis. Flex the elbow 90 degrees or more. Do not externally rotate the humerus. Palpate with your thumb past the latissimus dorsi and teres major to the anterior surface of the scapula, then superior to the brachial chords.
2. Contact inferior to the lesion. Draw the patient's skin and loose tissue to a point between the muscle and nerve. Exert tension along the nerve / muscle junction until sufficient tension is achieved.
3. Abduct the humerus, delaying motion of your contact until tension is felt to develop. Proceed within patient limits until the arm is raised overhead and the elbow is posterior as much as possible.

Notes — 824e

- Try to slide your contact between the muscle and nerve while holding the subscapularis medially and letting the nerve slide laterally. Make the second pass actively.
- Lack of brachial-chord sliding will usually become evident during the second half of the motion.

Figure 21

ILLUSTRATIONS

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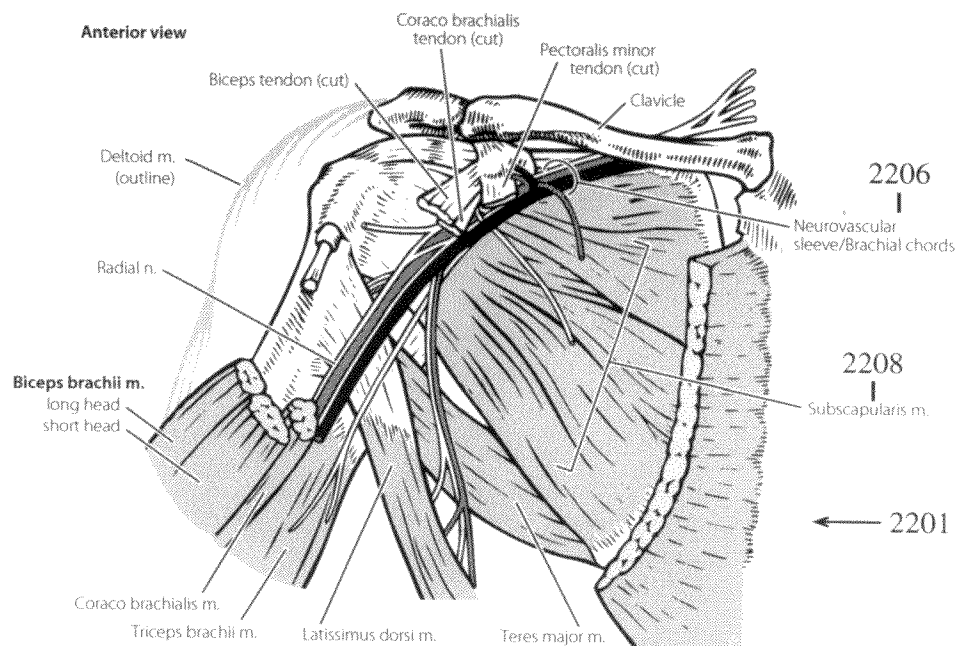
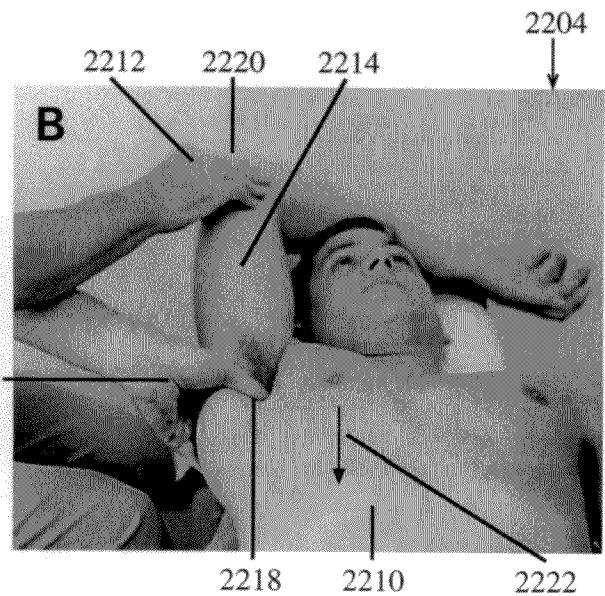
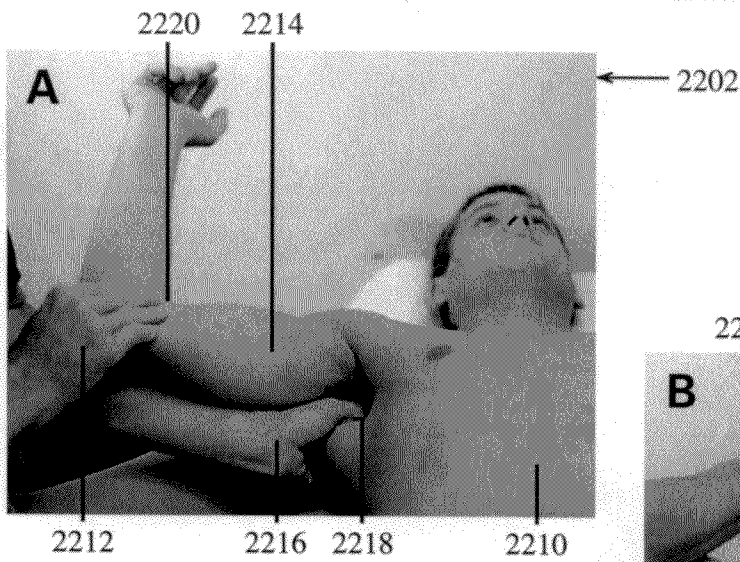


Figure 22

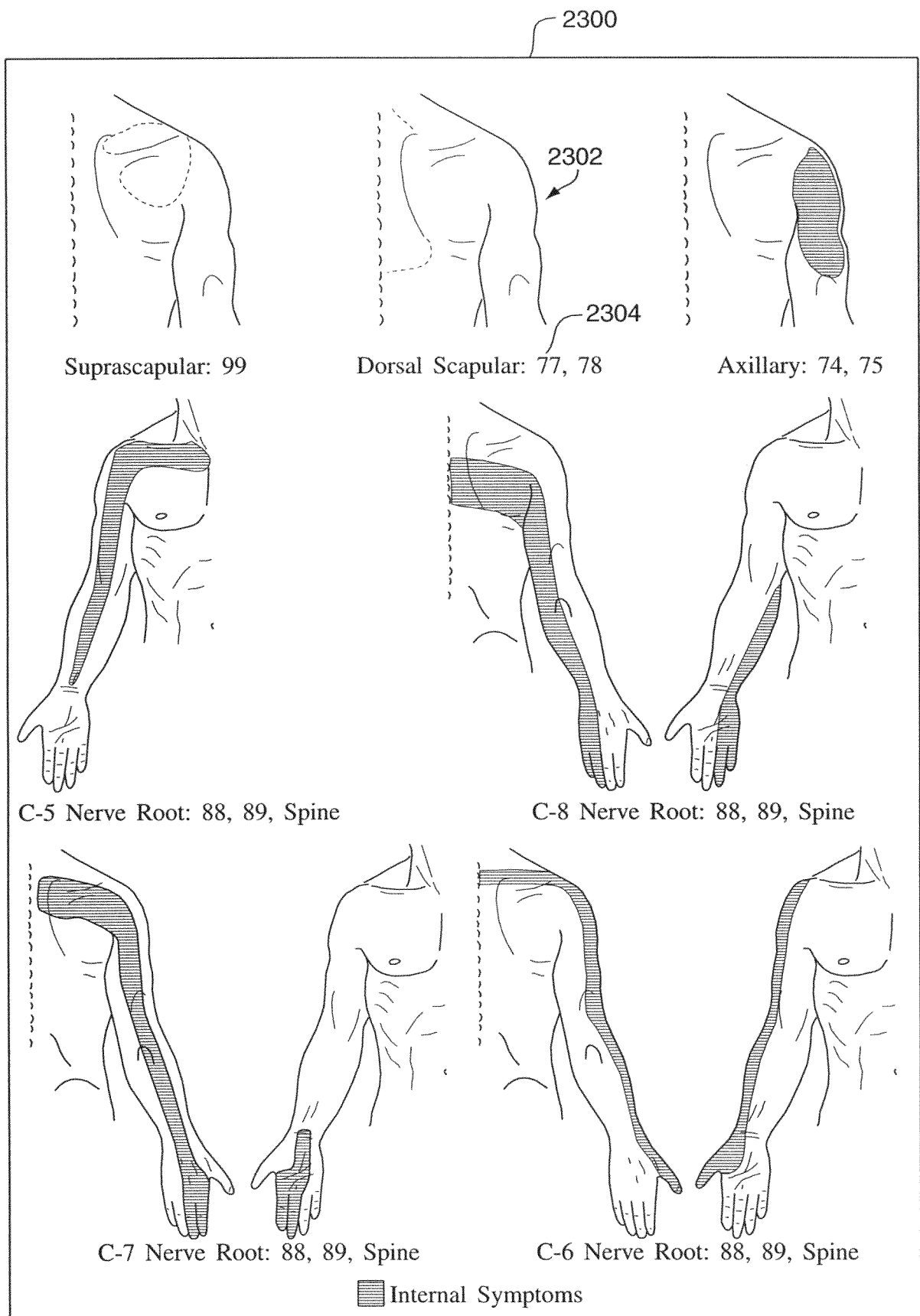


FIG. 23

78	<div>800f</div> <div>SHOULDER — 802f</div> <div>Dorsal Scapular Nerve at Serratus Posterior Superior</div>
2304	<div>804f</div> <div>SYMPTOM PATTERNS</div>
	<div>Dorsal scapular nerve</div> <div>Local pain</div> <div>Pain with prolonged extension, poor keyboard posture, holding stress, long time trial bike ride</div>
	<div>806f</div> <div>FUNCTIONAL ANATOMY</div>
	<div>The dorsal scapular nerve may be trapped at the serratus posterior superior next to the rhomboids. Treatment of both is usually necessary to complete the job. Take advantage of the relative motion between the muscles.</div> <div>Constant aggravation of the serratus posterior will eventually affect the dorsal scapular nerve.</div>
	<div>Diagnoses — 808f</div>
	<div>Peripheral nerve entrapment</div> <div>Myofascitis</div>
	<div>Related Treatment Protocols — 810f</div>
	<div>58 – Trapezius</div> <div>59 – Rhomboids</div> <div>60 – Rhomboids with serratus posterior superior</div> <div>70 – Levator scapulae</div>
	<div>812f</div> <div>TREATMENT</div> <div>Contact — 814f</div> <div>Multiple adjacent fingers</div> <div>Single thumb</div> <div>Pressure Tension — 816f</div> <div>High tension low compression</div> <div>Contact Motion — 818f</div> <div>Internal and external slide</div> <div>Patient Motion — 820f</div> <div>Active shoulder, passive neck</div> <div>Instructions — 822f</div> <div>1. Place the patient supine. Flex the neck laterally toward the treating side. Abduct the humerus 90 degrees.</div> <div>2. Draw tension under the contact by tractioning inferiorly along the side of the spinous processes until the lesion in the serratus is felt.</div> <div>3. Have the patient reach for the opposite hip while drawing your contact along the serratus, pulling the rhomboid.</div> <div>Notes — 824f</div> <div>• During the last 12 inches of hand / arm motion, the tension between the muscles increases rapidly. Slow the patient and contact motion. This is also the moment which any duplication of dorsal scapular nerve symptoms will appear.</div>

Figure 24

ILLUSTRATIONS

78

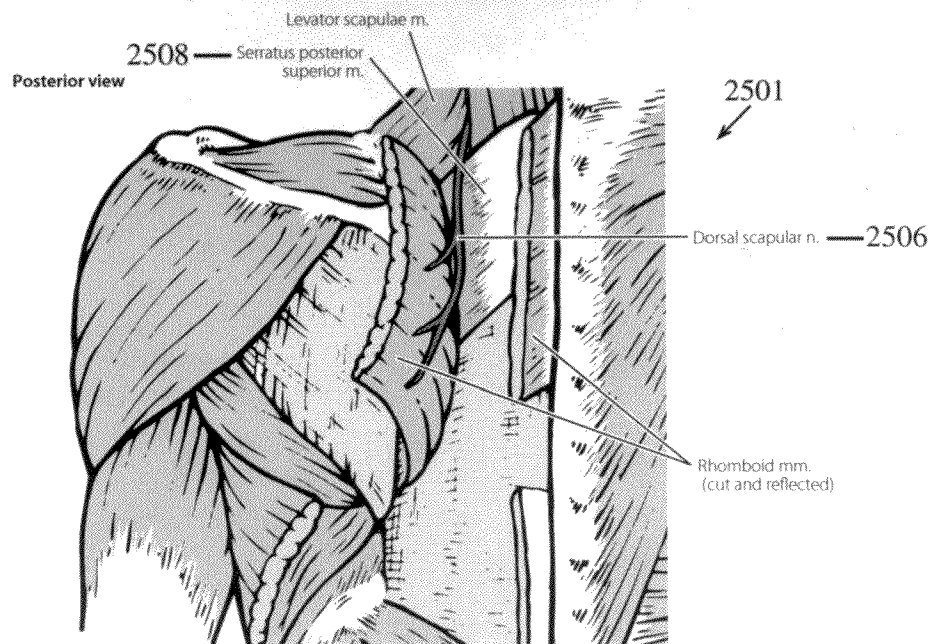
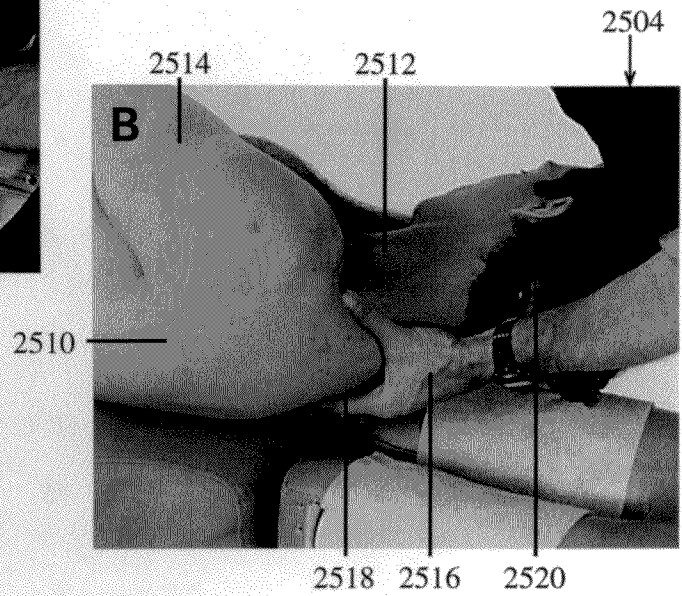


Figure 25

83	<p>FOREARM — 802g</p> <p>Median Nerve at Pronator Teres</p>	800g
2008	<p>SYMPTOM PATTERNS — 804g</p> <p>Median nerve</p> <p>Local pain</p> <p>Symptoms of carpal tunnel syndrome, difficulty with grip, ache in forearm, edema</p>	812g
	<p>FUNCTIONAL ANATOMY — 806g</p> <p>The pronator teres is often injured with repetitive motion of the hands. It is the most common site of entrapment of the median nerve. Care must be taken to accurately work these tissues from one end to the other, including the ulnar and humeral head. After practice, it is possible to feel for relative motion between the median nerve and the pronator teres.</p> <p>Symptoms are usually duplicated as treatment reaches the entrapment site. At this site make every effort to ensure sliding of the nerve under the muscle. If symptoms of entrapment are severe, the release may have to be accomplished in steps. Work to patient tolerance.</p>	
	<p>Diagnoses — 808g</p> <p>Peripheral nerve entrapment</p> <p>Myofascitis</p>	
	<p>Related Treatment Protocols — 810g</p> <p>23 – Flexor digitorum</p> <p>27 – Pronator teres</p> <p>29 – Lacertus fibrosis</p> <p>35 – Brachioradialis</p> <p>82 – Median nerve at flexor digitorum</p>	
	<p>TREATMENT — 812g</p> <p>Contact — 814g</p> <p>Single thumb</p> <p>Double thumb</p> <p>Pressure Tension — 816g</p> <p>High tension / low compression</p> <p>Contact Motion — 818g</p> <p>Internal and external slide</p> <p>Patient Motion — 820g</p> <p>Passive or active</p> <p>Instructions — 822g</p> <ol style="list-style-type: none"> 1. Pronate the patient's forearm and flex the elbow. 2. Draw tension on the pronator from the radial attachment proximally until moderate resistance is felt. 3. Have the patient slowly extend the elbow and supinate. As your contact nears the area where the muscle splits into a ulnar and humeral head, feel for the median nerve. Concentrate treatment in this area. <p>Notes — 824g</p> <ul style="list-style-type: none"> • Because this motion is difficult for the patient to learn, perform the first passes with the patient passive. Use active motions are subsequent to the patient learning the motion and a decrease in sensitivity in the severe cases. 	

Figure 26

ILLUSTRATIONS

83

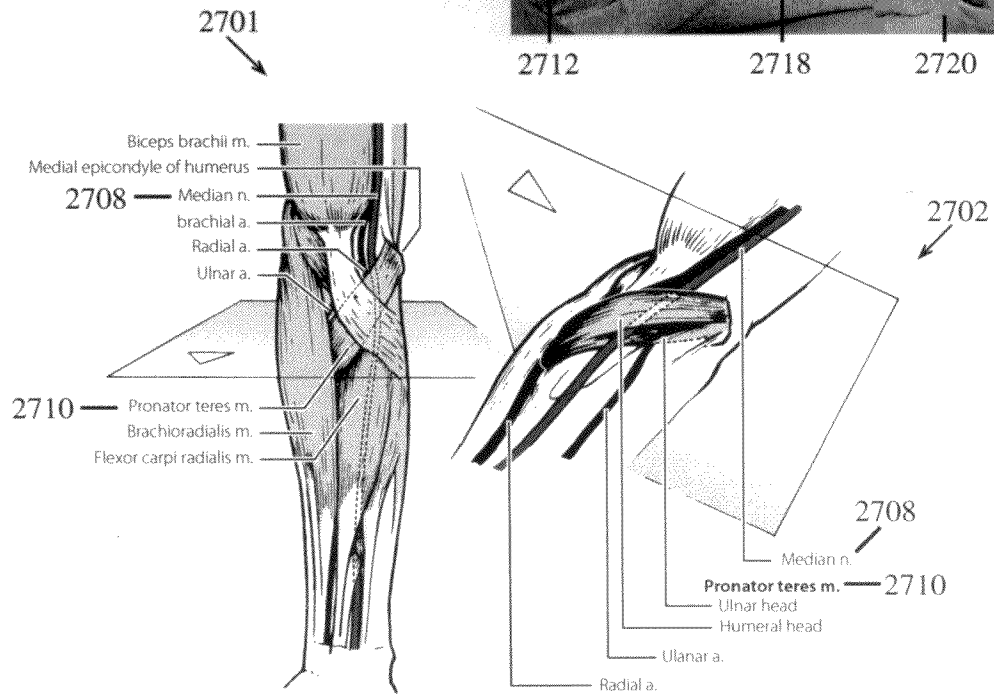
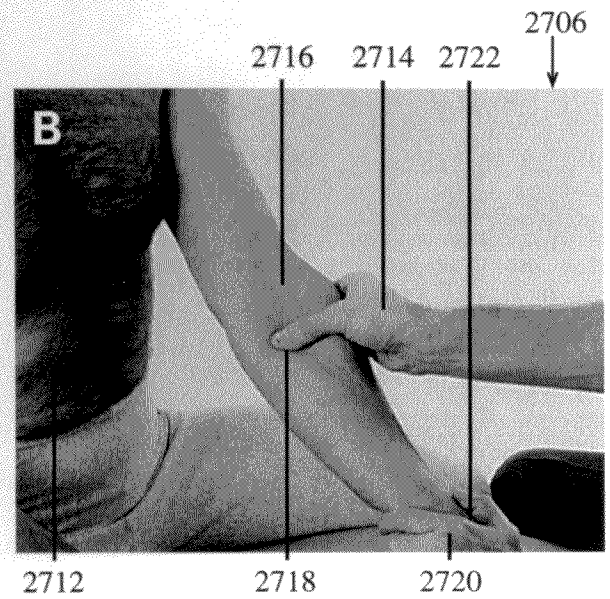
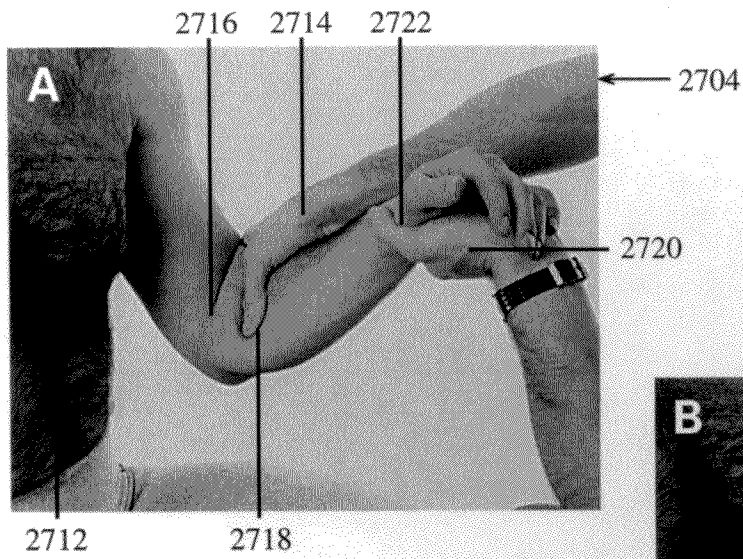


Figure 27

SHOULDER / ARM / HAND — 802h

Neurovascular Sleeve at Coraco-Pectoral Tunnel

2004

SYMPTOM PATTERNS — 804h

Multiple nerves
Non nerve root symptoms, odd neurological patterns, all nerves, whole hand, difficult abduction/external rotation

FUNCTIONAL ANATOMY — 806h

The neurovascular sleeve holds the axillary artery, vein, and all the nerves into the upper extremity. This structure slides in excess of 1.5 centimeters through this thoracic outlet. When an adhesion occurs, it will exert a significant pull on the nerves during humeral abduction.

The sleeve may be palpated by sliding your contact superior on the subscapularis to the roof of the axilla. The neurovascular sleeve should be palpable on the side of the contact thumb. It is possible to slide your contact to the anterior side of the sleeve, and sometimes to the superior side of it as well. Avoid applying undue compression on the nerves.

Palpate along the posterior side of the pectoralis minor to the coracoid process at which point the sleeve is palpable. It is usually possible to work your contact between the pectoralis minor and the sleeve. The neurovascular sleeve may sometimes be traced and worked all the way to the clavicle and scalenes at the first rib.

Diagnoses — 808h

Peripheral nerve entrapment
Myofascitis

Related Treatment Protocols — 810h

44 – Coracobrachialis
47 – Pectoralis minor
51 – Subscapularis
85 – Neurovascular sleeve at the coracobrachialis

800h

TREATMENT — 812h

Contact — 814h

Single thumb

Pressure Tension — 816h

High tension / low compression

Contact Motion — 818h

Internal and external slide

Patient Motion — 820h

Active

Instructions — 822h

1. Orient the patient supine. Slightly abduct the humerus, supporting the patient's upper arm with a firm comfortable grasp. Flex the elbow 90 degrees or more, and do not externally rotate the humerus. Protract the shoulder.
2. Palpate with your thumb along the posterior side of the pectoralis minor to the sleeve and coracoid process. Exert medial tension along the nerve / muscle junction until sufficient tension is achieved.
3. Abduct the humerus, delaying supero-medial contact motion until tension develops. End with over 90 degrees abduction and maximum posterior extension. Stay within patient tolerance.

Notes — 824h

- Try to slide your contact between the muscle, or coracoid and nerve, while holding the muscle medially and letting the sleeve slide laterally. Follow the neurovascular sleeve as far toward the first rib and scalenes as possible.
- Lack of gliding of the sleeve will usually become evident during the second half of the motion.

Figure 28

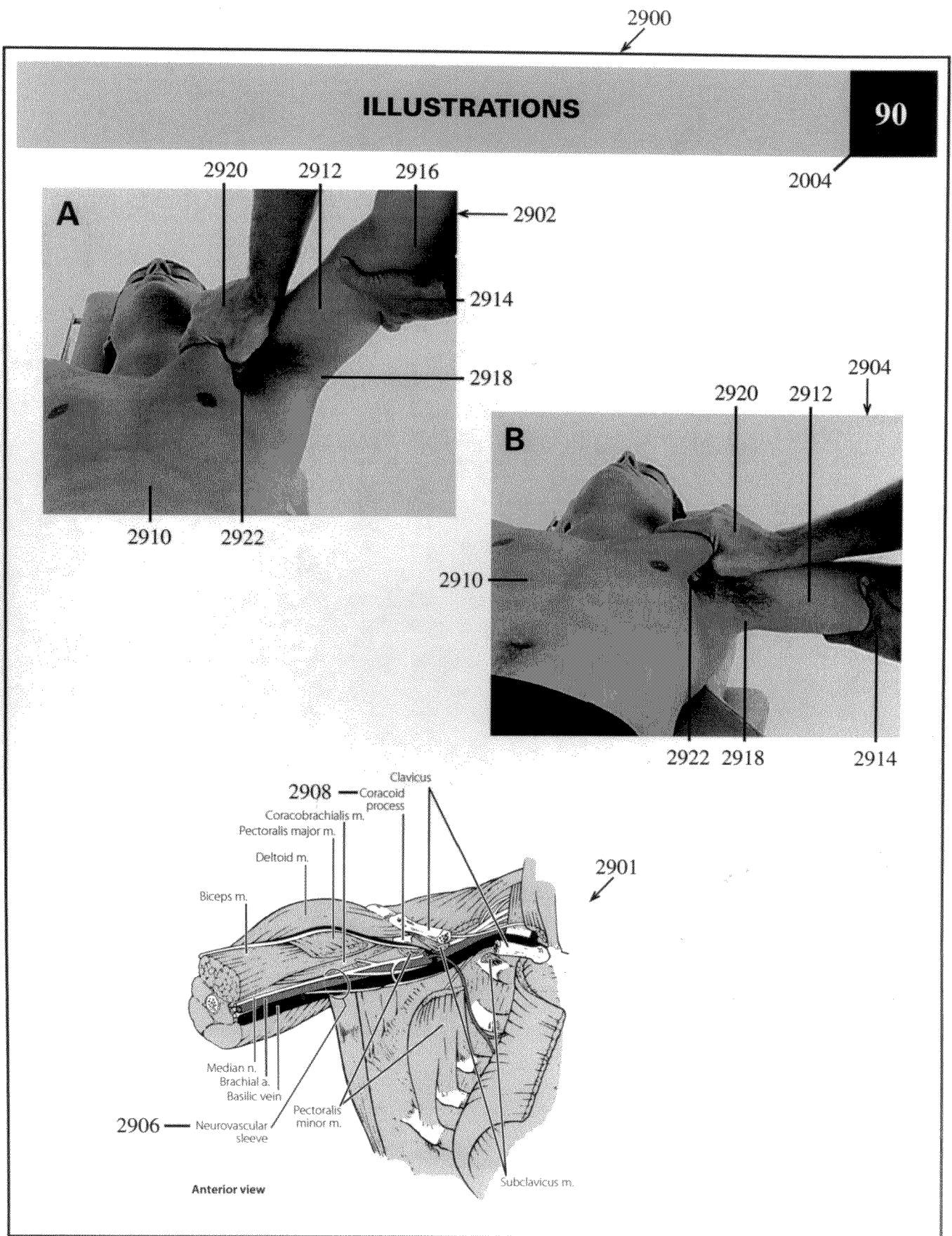


Figure 29

Radial Nerve at Distal Brachioradialis

2012

SYMPTOM PATTERNS — 804i

Radial nerve
Local pain
DeQuervain's, tennis elbow, grasp and lift,
fast pitch softball

FUNCTIONAL ANATOMY — 806i

The brachioradialis is classified as an elbow flexor, but it is in a poor position to accomplish the task. It is active during a grasp-and-lift motion, especially if the wrist is neutral. It lies along the extensor carpi radialis longus for its entire length, but it does not cross the wrist. Its relationship to the first compartment of the extensor retinaculum, and the fascia around the wrist, is important to entrapment of the superficial branch of the radial nerve.

The extensor carpi radialis muscles can also be involved with the brachioradialis in compromising the superficial branch of the radial nerve. The radial nerve can also be trapped between the brachioradialis and the brachialis.

Diagnoses — 808i

Peripheral nerve entrapment
Myofascitis

Related Treatment Protocols — 810i

- 13 – Extensor pollicis brevis and abductor pollicis longus
- 14 – Extensor and abductor pollicis with extensor retinaculum
- 27 – Pronator teres
- 30 – Extensor carpi radialis
- 35 – Brachioradialis
- 39 – Brachialis

800i

TREATMENT — 812i

Contact — 814i

Single thumb
Double thumb

Pressure/Tension — 816i

High tension / low compression

Contact Motion — 818i

Internal and external slide

Patient Motion — 820i

Active or passive

Instructions — 822i

1. Flex the patient's elbow and supinate the wrist.
2. Contact along the muscle and traction proximally.
3. Extend the patient's elbow and draw your contact proximally. At the end of this motion, pronate the wrist.

Notes — 824i

- Working the entire tendon and muscle body requires several passes over multiple areas to reach the humeral attachment next to the brachialis.
- Apply tension and pressure judiciously over the distal attachment. This area is often sensitive and reacts adversely to excessive pressure.

Figure 30

ILLUSTRATIONS

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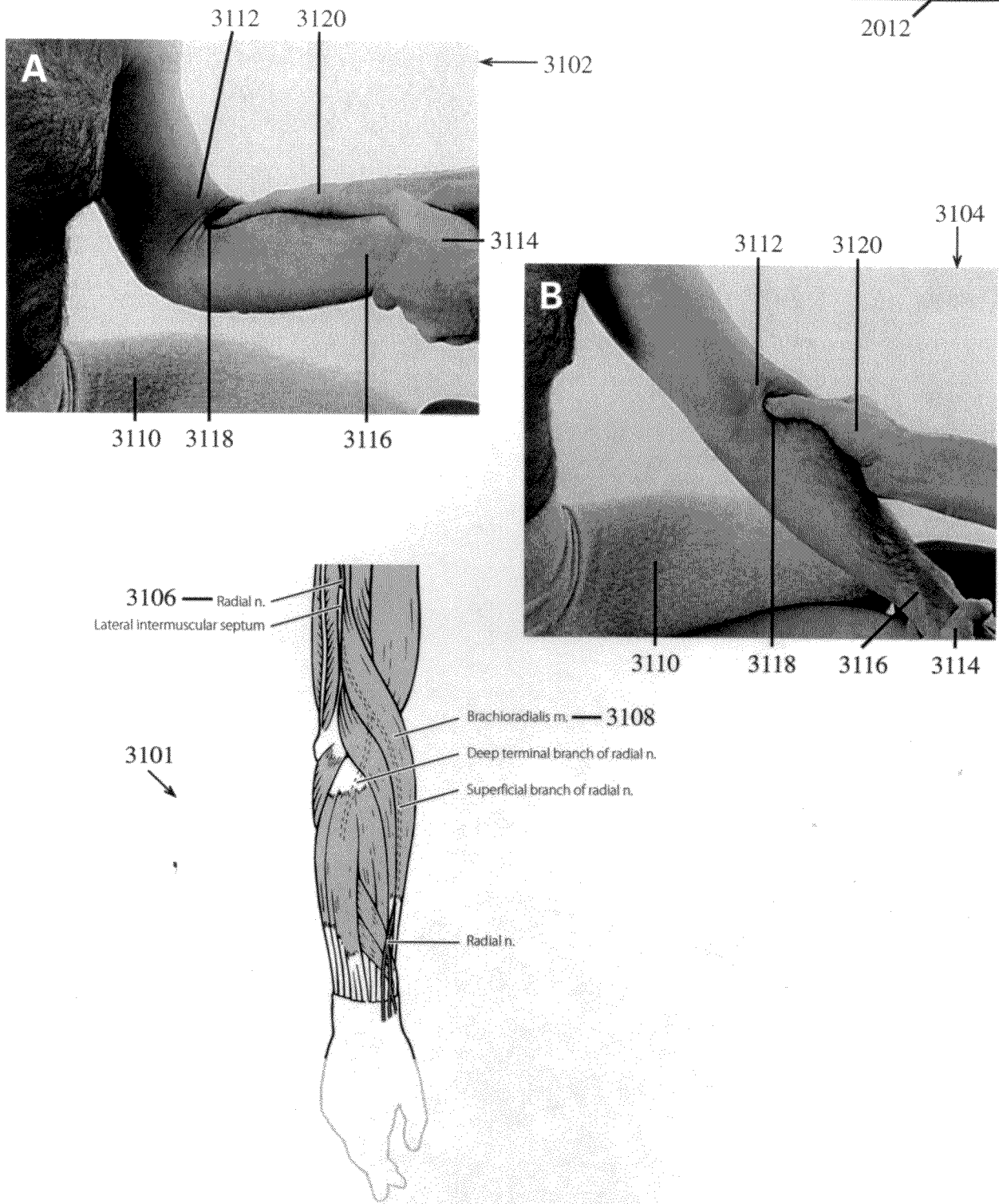


Figure 31

FOREARM / WRIST — 802j

Ulnar Nerve at Flexor Carpi Ulnaris

2022

SYMPTOM PATTERNS — 804j

Ulnar nerve
Local pain
Golfer's elbow, ulnar wrist pain, pain resting forearm

FUNCTIONAL ANATOMY — 806j

The ulnar nerve is not compromised in the cubital tunnel by compression. When the nerve is entrapped distal and proximal to the tunnel by the flexor carpi ulnaris and the medial intermuscular septum / triceps, it is stretched over the joint during elbow flexion. The nerve is flattened in the tunnel by the tension on either end.

When this happens, there is no decompression possible at the tunnel that will resolve the problem. It must be treated at the actual entrapment sites.

This muscle is important in ulnar nerve entrapment. It can, however, be injured without nerve involvement.

The area of concern is at the proximal end of the muscle where the nerve travels through it. In general, work the muscle first, then the interface between the nerve and the muscle on either side. Do not apply pressure directly on the nerve during treatment.

Because the flexor carpi ulnaris lies posterior to the elbow's axis of rotation, it lengthens during flexion. This is the opposite of the bulk of the forearm flexors.

Diagnoses — 808j

Peripheral nerve entrapment
Myofascitis

Related Treatment Protocols — 810j

- 22 – Pronator quadratus with flexor carpi ulnaris
- 42 – Medial intermuscular septum
- 71 – Brachial chords at subscapularis
- 72 – Brachial plexus at scalenes
- 90 – Neurovascular sleeve at coraco-pectoral tunnel
- 91 – Neurovascular sleeve at coracobrachialis
- 102 – Ulnar nerve at pronator quadratus and flexor carpi ulnaris

800j

TREATMENT — 812j

Contact — 814j

Multiple adjacent fingers
Double thumb

Pressure Tension — 816j

High tension / low compression

Contact Motion — 818j

Internal and external slide

Patient Motion — 820j

Active or passive

Instructions — 822j

1. Extend the patient's elbow and flex the wrist.
2. Contact on either side of the nerve at the proximal limit of the muscle, and draw tension from proximal to distal. Avoid excessive pressure on the ulnar nerve as it exits the cubital tunnel.
3. Flex the patient's elbow and extend the wrist as you draw your contact distally along the muscle/nerve interface.

Figure 32

ILLUSTRATIONS

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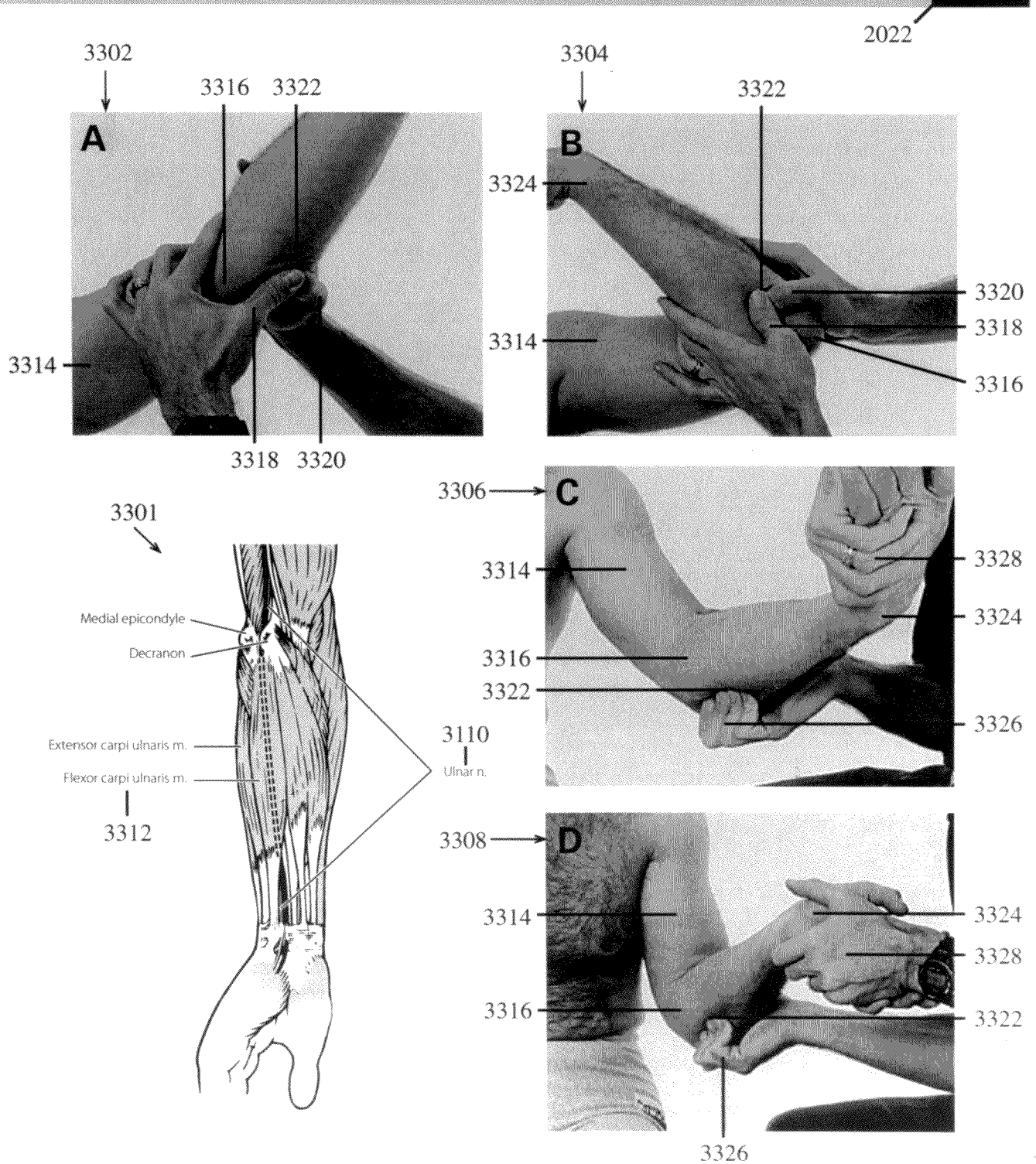


Figure 33